

FILE w/ 2003

OPERATION
AND
SERVICE MANUAL

MODEL 3340B
R.F. OUTPUT/
ATTENUATOR
PLUG-IN UNIT



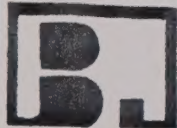
BERKELEY CONTROLS, INC.
BERKELEY INSTRUMENTS, INC.
TELONIC BERKELEY, INC.

2825 LAGUNA CANYON ROAD (714) 494-9401
P.O. BOX 277 LAGUNA BEACH, CALIFORNIA 92652



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AND
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NO. 490314

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MODEL 3340B

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MODEL 3340B

1.0 INTRODUCTION

1.1 Description

The Model 3340B R.F. Output/Attenuator Plug-In Unit is designed for use with the 2003 Sweep/Signal Generator Control Chassis. It provides an R.F. output that can be attenuated from 0 to 110dB in 1dB steps. It also provides for internal, external or unlevelled operation.

The "EXTERNAL MARKER IN" jack is used for generating a marker from an external source.

1.2 Electrical Specifications

1.2.1	Output	Sweep Oscillator Plug-In Unit used minus insertion loss of attenuators.	
1.2.2	Impedance	50 Ω	75 Ω
1.2.3	Frequency Range	DC to 1600 MHz	DC to 1000 MHz
1.2.4	Attenuation	0 to 110dB 1dB per step	0 to 80dB 1dB per step
1.2.5	Accuracy	± 0.3 dB, 1-10dB $\pm 3\%$, 10-110dB	± 0.3 dB, 1-10dB $\pm 3\%$, 10-80dB
1.2.6	VSWR	1.3:1 Max., DC to 1500 MHz	1.3:1 Max., DC to 1000 MHz
1.2.7	Flatness	± 0.5 dB, DC to 1600 MHz	± 0.5 dB, DC to 1000 MHz
1.2.8	External Marker Input Impedance	50 Ω	50 Ω
1.2.9	External Marker Input Level	100 mV Min.	100 mV Min.

1.3 Mechanical Specifications

1.3.1	Frame Construction	Aluminum
1.3.2	R.F. Output Connector	Type "N", Female

1.4 Environmental

1.4.1	Temperature	Calibrated 25°C $\pm$ 10°C Operational 0°C to +50°C
1.4.2	Other	Normal Laboratory Conditions

2.0 OPERATING INSTRUCTIONS

This section provides a description of the 3340B Front Panel Controls and their operation.

2.1 Front Panel Controls (refer to Figure 2-1)

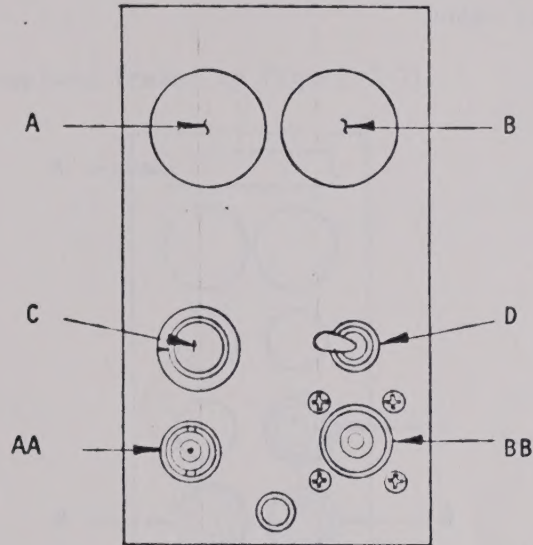


Figure 2-1

Front Panel Controls

- | | |
|---------------------|---|
| A - Attenuator Knob | Provides a control to vary attenuation from 0 to 10 dB in 1 dB steps. |
| B - Attenuator Knob | Provides a control to vary attenuation from 0 to 100 (50 Ω) or 0 to 80 (75 Ω) in 10dB steps. |
| C - Vernier Control | Provides a means of varying Automatic Leveling; the range of this control is determined by the Maximum and Minimum level controls of the oscillator in use. |
| D - ALC Switch | Provides a means of selecting Internal Automatic Leveling, External Automatic Leveling, or unlevelled operation. |

2.2 Front Panel Connectors

AA - External Marker Input Connector

Provides an electrical connection for external marker signal source.

BB - R.F. Output Connector

Provides electrical connection for R.F. output to unit under test.

2.3 Rear Panel Connectors (refer to Figure 2-2)

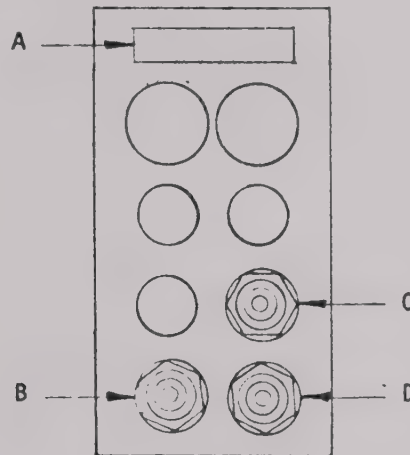


Figure 2-2

Rear Panel Connectors

A - Power Connector (J1)

Provides electrical connection to 2003 control chassis.

B - R.F. Input (J2)

Provides electrical connection for R.F. input signal from 2003 control chassis.

C AND D - Sweep Sample Outputs (J3 & 4)

Provides electrical connection for sweep sample outputs to the 2003 marker areas.

2.4 Pre-Operation

The following procedure must be performed before operating the Model 3340B R.F. Output/Attenuator Plug-In unit.

CAUTION

Ensure that the 2003 power switch is in the OFF position before inserting plug-ins in 2003 control chassis.

- 2.4.1 Insert the 3340B into Area IV of the 2003 control chassis and tighten the front panel knurled fastening knob.
(Refer to Figure 2-3)

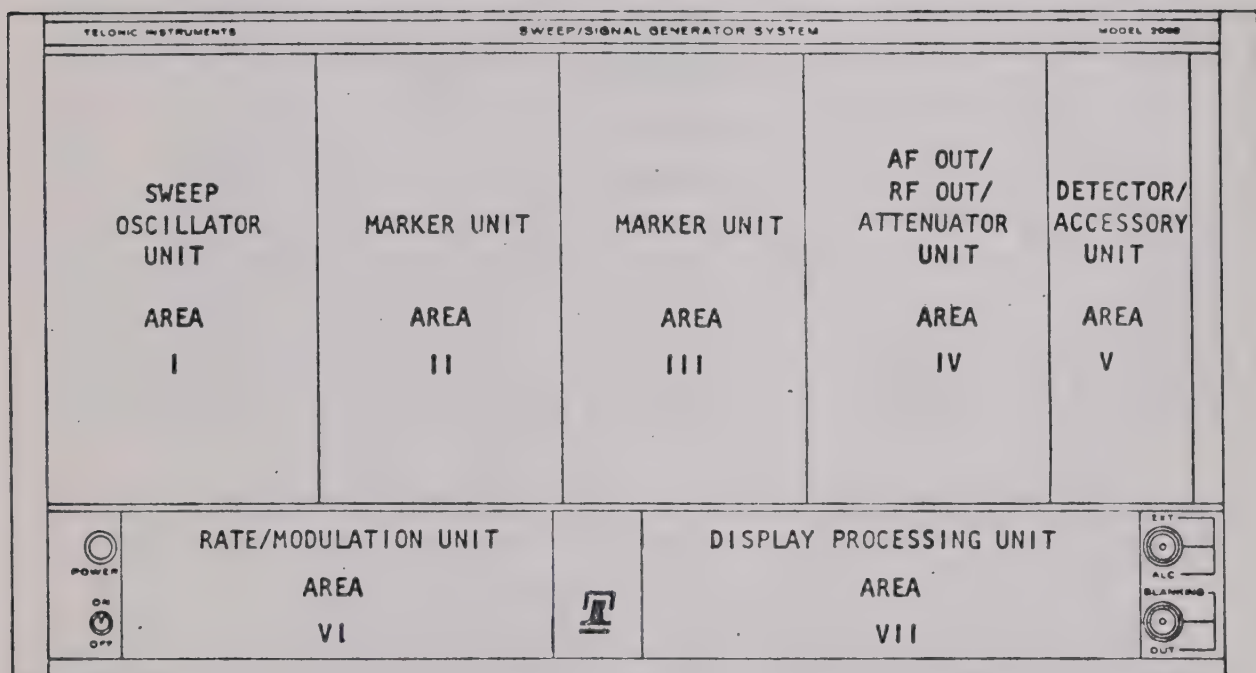


Figure 2-3. 2003 Plug-in Locations

2.4.2 Connect the 2003 to the unit under test as shown in Figure 2-4.

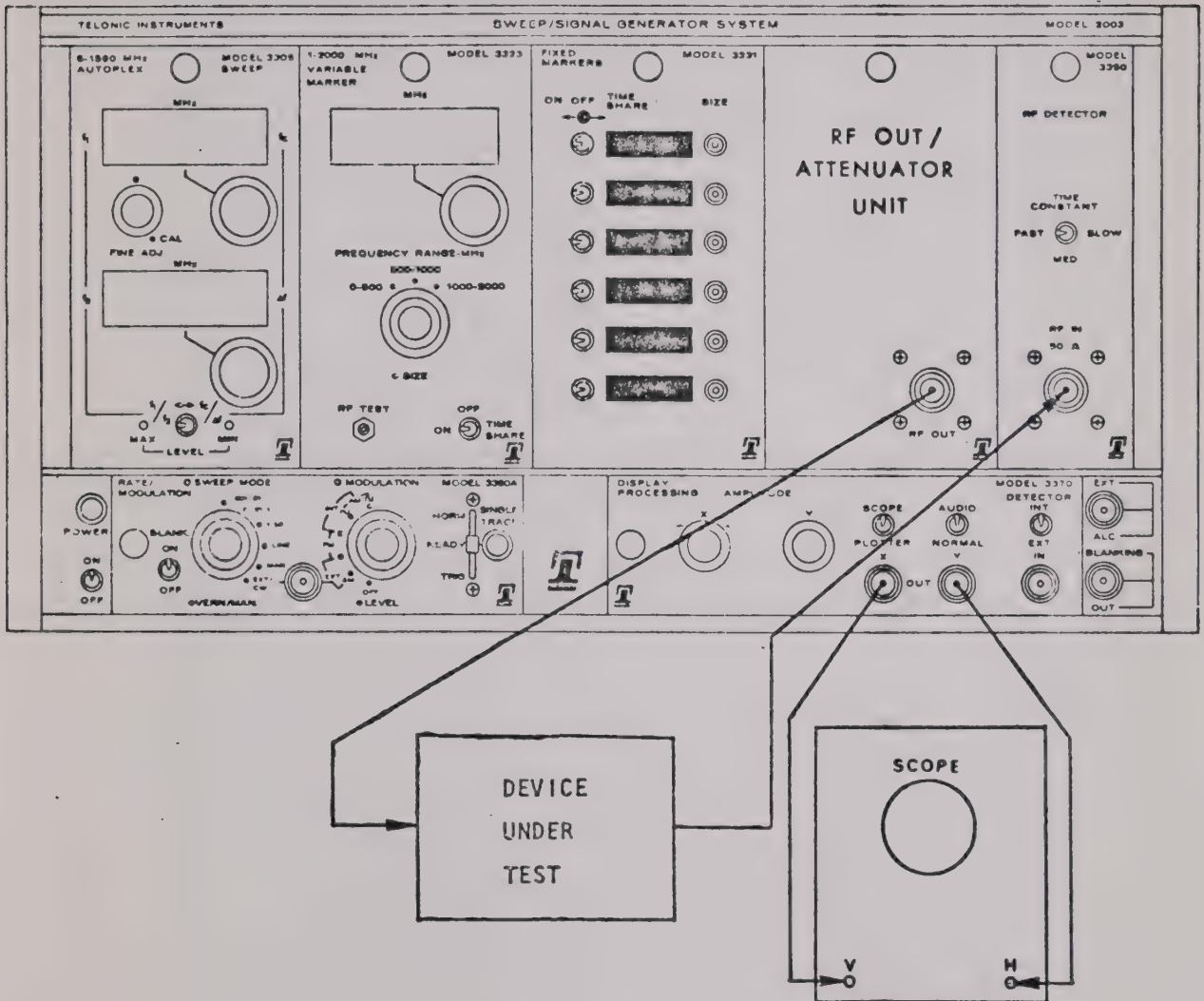


Figure 2-4. Typical Test Connections

2.5 Operating Procedure

- 2.5.1 Refer to the 2003 control chassis operation and service manual for 2003 operation.
- 2.5.2 Set ALC switch to the desired position.
- 2.5.3 Adjust attenuator for the desired attenuation.
- 2.5.4 Adjust attenuator vernier for the desired output (ALC switch in the INT. or EXT. position).

3.0 THEORY OF OPERATION

3.1 General Description

This section provides a brief description of the electrical circuits of the Model 3340B.

NOTE

Refer to appropriate schematic diagram located in Section 5, when reading the Theory of Operation.

- 3.1.1 Minimum and maximum level reference voltages are coupled in through rear panel connector J1, Pins 26 and 25 respectively. These voltages are applied to opposite ends of the attenuator vernier pot R1. The reference output voltage is coupled from the wiper of R1 to Pin 23 of J1.
- 3.1.2 The R.F. sweep voltage input is coupled to the Monitor from the rear panel R.F. connector J2.
- 3.1.3 The Monitor provides R.F. coupling to the attenuator through impedance matching resistor R1 in the Monitor.
- 3.1.4 The R.F. sweep voltage, whose attenuation is determined by the setting of the front panel attenuator controls, is coupled through RF out front panel connector J5.
- 3.1.5 Two R.F. sweep sample voltages from the Monitor are coupled out through the rear panel connectors J3 and J4, to the 2003 control chassis marker plug-in areas.
- 3.1.6 A portion of the R.F. signal is fed through R2 in the Monitor to CR1 and CR2. The resulting positive and negative ALC voltages are fed out to rear panel connector J1, pins 28 and 27 respectively.
- 3.1.7 The plus and minus ALC voltages are fed through the sweep oscillator plug-in unit, and are coupled back through pins 29 and 30 of J1 to ALC switch S1.

3.1.8 ALC switch S1 is a couple pole 3-position switch that determines whether:

1. Internal ALC voltage from the Monitor is coupled out to leveler through pins 32 and 36 of J1, or
2. External ALC voltage (negative only) from the 2003 front panel connector is coupled out to leveler through pins 32 and 36, or
3. No ALC voltage coupled out to leveler.

3.1.9 The external marker R.F. voltage, when present, is coupled from front panel connector J6 through C5 and R13 to mixer diode CR3.

3.1.10 A portion of the R.F. sweep voltage and the external marker R.F. voltage are heterodyned in the mixer, and the resultant difference frequency is coupled out through pin 21 of rear panel connector J1.

4.0 MAINTENANCE

4.1 General

This section provides the necessary information to perform the calibration and maintenance of the Model 3340B R.F. Output/Attenuator Plug-In Unit.

4.2 Required Test Equipment:

4.2.1	Sweep/Signal Generator Control Chassis	Telonic Model 2003
4.2.2	Sweep Oscillator Plug-In Unit	" " 3305B
4.2.3	Rate Modulation Plug-In Unit	" " 3360
4.2.4	Display Processing Plug-In Unit	" " 3370
4.2.5	R.F. Detector Plug-In Unit	" " 3350 or External Detector
4.2.6	Oscilloscope	H.P. 130 or Equivalent

4.3 Performance Check

This check may be used as a routine maintenance procedure or as an incoming inspection to verify performance.

4.4 Initial Set Up

4.4.1 Connect test equipment as shown in Figure 4-1.

4.4.2 Set test equipment controls as follows:

POWER switch (2003)	ON
BLANKING (3360)	ON
SWEEP MODE (3360)	LINE
SINGLE TRACE (3360)	NORM
MODULATION (3360)	OFF
SCOPE/PLOTTER Switch (3370)	SCOPE
DETECTOR Switch (3370)	INTERNAL
Mode Switch (3305)	f_1/f_2
f_1-f_c Control (3305)	5 MHz
$f_2-\Delta f$ Control (3305)	1500 MHz (50 μ units) 1000 MHz (75 μ units)
ALC Switch, unit under test	INT
ATTENUATOR VERNIER, unit under test	fully clockwise
ATTENUATION Controls	for 0 Attenuation

4.5 Automatic Leveling Operation

- 4.5.1 Observe the oscilloscope for a level display. Display amplitude is determined by the maximum level adjustment of the 3305B sweep oscillator plug-in unit. Refer to appropriate operation and service manual for maximum and minimum level adjustment procedures.
- 4.5.2 Slowly rotate the ATTENUATOR VERNIER Control in a counter-clockwise direction and observe the oscilloscope for a waveform that decreases evenly across the screen to a minimum level determined by the Oscillator Minimum Level Adjust.
- 4.5.3 Set the ALC switch to the OFF position and observe the oscilloscope for an unlevelled output across the band.
- 4.5.4 Set the ALC switch to the EXT position and observe the oscilloscope for an unlevelled output across the band.

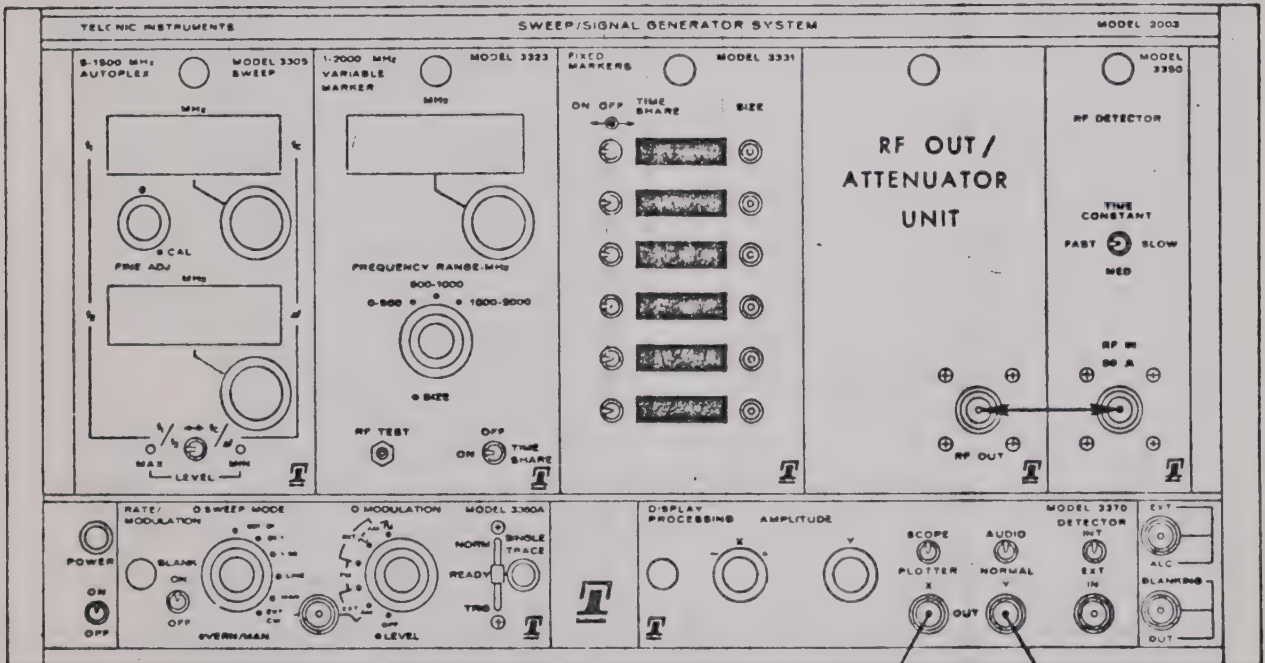
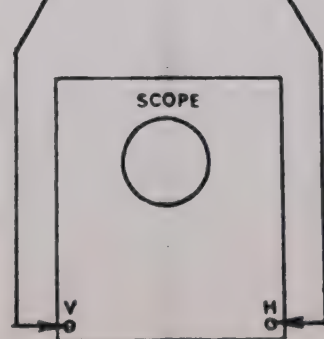


Figure 4-1. Typical Performance Test Connections



MODEL 3340B

4.6 Maintenance

The maintenance of the Model 3340B R.F. Output/Attenuator Plug-In Unit will be limited to replacement of diodes in the Monitor assembly. The ALC and Mixer Diodes are preselected for lowest loss. Therefore, exact replacement with respect to part number, lead length and physical location of the components is essential.

5.0 PARTS LISTS AND SCHEMATIC DIAGRAMS

5.1 General

This section provides the complete parts lists and schematic diagrams required for maintenance of the Model 3340B R.F. Output/Attenuator Plug-In Unit.

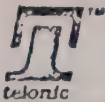
5.2 Index of Drawings

Parts lists and schematic diagrams for the 3340B are included in the following order in this section:

<u>Title</u>	<u>Drawing No.</u>
Schematic, Wiring	54-0314- ()
Parts List, Output Attenuator	95-0314- ()
Schematic, Monitor	54-0318- ()
Parts List, Monitor	95-0318- ()

5.3 Drawing Practice

- 5.3.1 All components in each assembly are numbered in sequence from "1".
- 5.3.2 All resistors are shown in ohms unless otherwise specified.
- 5.3.3 All capacitor values are shown in picofarads (pF) unless otherwise specified.
- 5.3.4 All inductor values are shown in microhenries (μ H) unless otherwise specified.
- 5.3.5 Table 5-1 specifies the abbreviations used for components in the Model 3340B parts lists.



STANDARD PROCEDURE

TABLE 5-1

Rev	Signature	Date	Dist: ENGINEERING DEPARTMENT
-----	-----------	------	------------------------------

Orig	KERANEN	10-26-70
------	---------	----------

Appl	RH. Greenich	10-26-70
------	--------------	----------

A	Free	1/28/71
---	------	---------

B	KERANEN	10-1-71
---	---------	---------

C		
---	--	--

3.6 Component Designations

Component	Part Description	Circuit Reference
Capacitors:		
Fixed Ceramic	CFC	C
Fixed Ceramic Feed-Thru	CFCF	C
Fixed Discap	CFD	C
Fixed Electrolytic	CFE	C
Fixed Metal Film	CFF	C
Fixed Mica	CFM	C
Fixed Mylar	CFMY	C
Fixed Composition	CFN	C
Fixed Oil	CFO	C
Fixed Paper	CFP	C
Fixed Polyester	CFPE	C
Fixed Teflon	CFT	C
Fixed Tantalum	CFTA	C
Trimmer, Ceramic, Disc	CTCD	C
Trimmer, Ceramic, Tubular	CTCT	C
Variable, Air	CVA	C
Variable, Glass-dielectric	CVG	C
Printed		CP
Circuit Breakers	EKT BKA	S
Crystals	XTAL	Y
Diodes:		
Semiconductor	DS	CR
Semiconductor, Tunnel	DST	CR
Semiconductor, Varactor	DSV	CR
Semiconductor, Zener	DSZ	CR
Fuses	--	F
Inductors:		
Fixed	IF	L
Variable	IV	L
Printed		LP
Integrated Circuits:		
Digital	ICD	E
Linear	ICL	E
Lamps, Indicator	LI	DS
Meters	--	M
Plugs, Cable	PC	P
Power Supplies	PMR SUP	PS
Printed Circuit Boards	PCB	PCB
Receptacles, Jack	RJ	J
Resistors:		
Fixed Composition	RFC	R
Fixed Carbon Film	RFCF	R
Fixed Metal Film	RFMF	R
Fixed Wirewound	RFWW	R
Variable, Composition	RVC	R
Variable, Dual Composition	RVDC	R
Variable, Dual, Wirewound/Composition	RVDWW	R
Voltage Variable (Varistor)	RVV	R
Variable, Wirewound	RVWW	R
Switches:		
Rotary	SWR	S
Slide	SWs	S
Toggle	SVT	S
Terminator Cables	TC	--
Test Points	TP	TP
Time Delay	TD	--
Transformers, Power	XPWR	T
Transistors	TR	Q
Field Effect	TRFE	Q
Tubes, Electron	TE	V
Wires	--	W

1.0 SCOPE.

This document describes and defines standard abbreviations to be used in all Telonic Industries drawings and communications.

2.0 PURPOSE.

To establish a uniform list of standard abbreviations.

3.0 LIST OF ABBREVIATIONS.

3.1 Prefixes.

3.1.1 Multiple

Number	Prefix	Abbrev.
10 ⁹	GIGA	G
10 ⁶	MEGA	M
10 ³	KILO	k

3.1.2 Submultiple

Number	Prefix	Abbrev.
10 ⁻³	MILLI	m
10 ⁻⁶	MICRO	μ
10 ⁻⁹	NANO	n
10 ⁻¹²	PICO	p

3.2 Units.

Unit	Abbrev.
HERTZ	Hz
AMPERE	A
WATT	W
VOLT	V
FARAD	F
HENRY	H
OHM	Ω

3.3 Unless Specified.

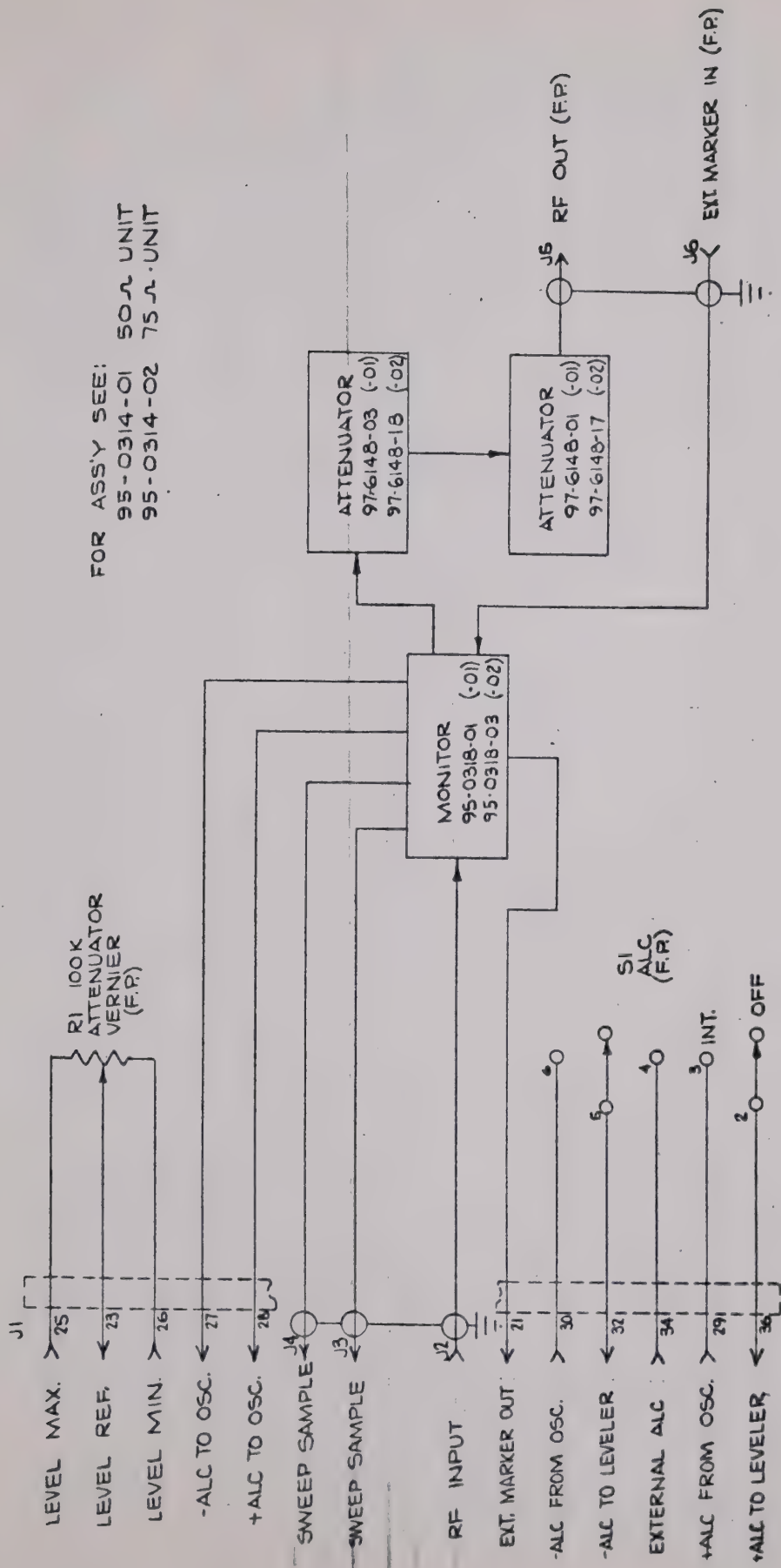
Resistors are 1/4 watt in ohms.
Capacitors are in pF.

3.4 Colors.

Color	Abbrev.
BLACK	BLK.
RED	RED
BLUE	BLU.
WHITE	WHT.
GREEN	GRN.
ORANGE	GRN.
VIOLET	VIO.
BROWN	BRN.
YELLOW	YEL.
GRAY	GRA.

3.5 Miscellaneous

DECIBEL	dB
FREQUENCY CONTROLLED	
VOLTAGE	FCV
FACTORY SELECTED	
VALUES	FSV
GROUND	GRD.
NOT ASSIGNED	NA
PART OF	PO
PEAK-TO-PEAK	P-P
SAME AS	SA
SUBJECT TO CHANGE	SC



EXT.

A-EC7004
B-EC7148
D-EC7175
F-EC7303

BY
CHK
END
APVD

STEADMAN
8/16/72
S/17/73

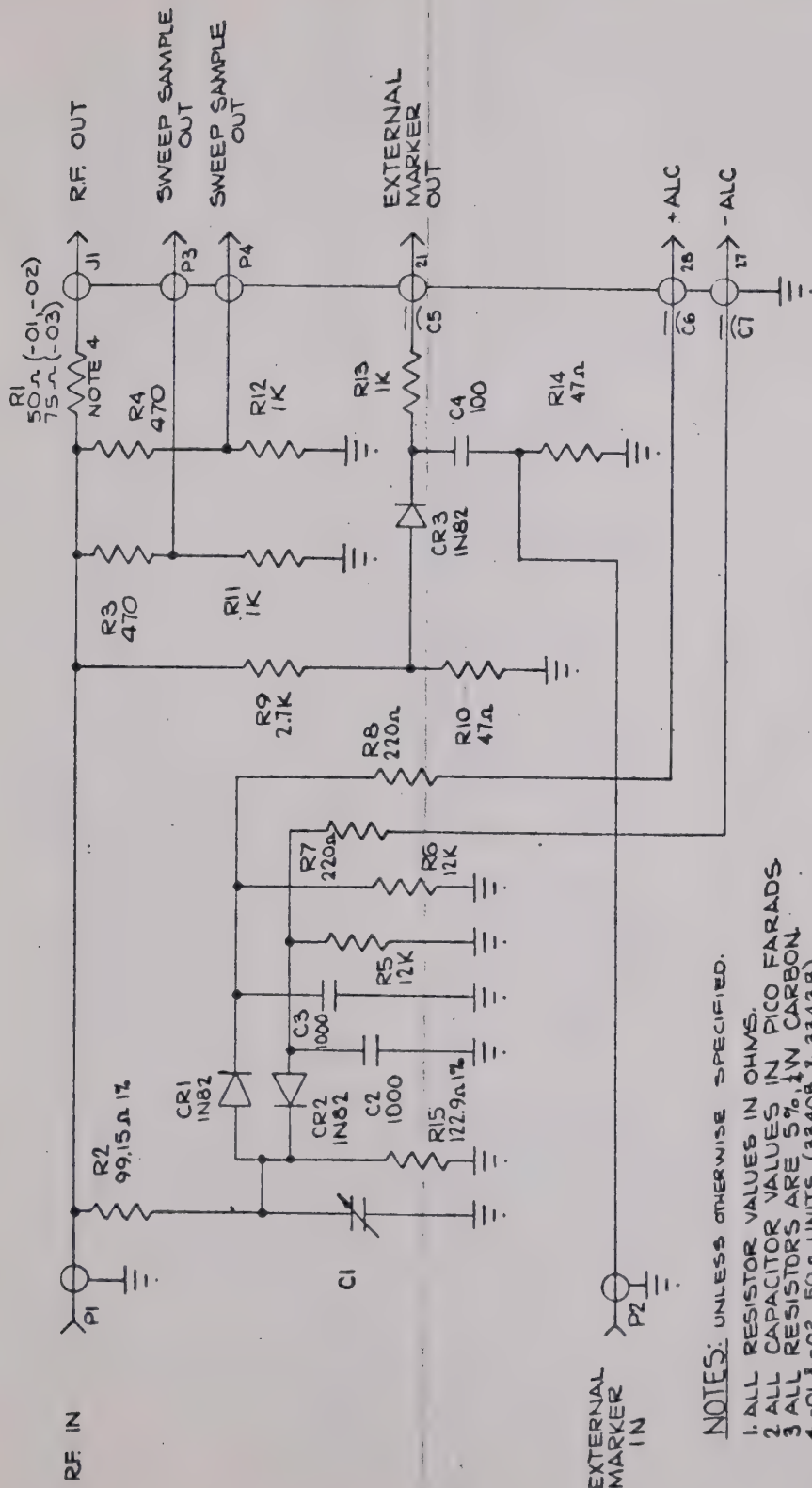
DATE
7/10/72

TELEONIC INDUSTRIES, INC.
21202 Laguna Canyon Road • Box 277
Laguna Beach, California 92652
Tel: 714 434 9401 • TWX 910 596 1320

REI
SH3
OF 3
SIZE
A
95-0314-(-)
REV
J

ITEM	PART NUMBER	QTY		DESCRIPTION	CKT REF
		-01	-02		
1	95-0318-01	1		Assy., Monitor	
2	97-0325-01	1	1	Assy., Harness	
3	97-6148-01	1		Assy., Attenuator 100 dB	
4	97-6148-03	1		Assy., Attenuator 10 dB	
5					
6	97-9604-01	2		Assy., Cable	
7	97-9598-01	1		Assy., Cable	
8	02-7006-07		4	Scr., P.H. 6-32 X 7/16	
9	96-5206-01	1		Front Panel, 3340B	
10	03-0215-01		2	Spacer, Adapter	
11	02-0062-01	2	2	Scr., 3-48 x 3/8	
12	02-7004-06	4	4	Scr., P.H. 4-40 x 3/8	
13	02-7006-04	4		Scr., P.H. 6-32 x 1/4	
14	02-7004-04	4	4	Scr., P.H. 4-40 x 1/4	
15	03-0156-01	1	1	Washer, Lock 1/4	
16	03-0157-01	1	1	Washer, Nylon #8	
17	03-0160-01	6	6	Washer, Clamp	
18	03-0161-01	3	3	Washer, Spacer	
19	03-0165-01	2	2	Nut, Hex 3-48	
20	03-0176-01	1	1	Nut, Knurled 1/4-40	
21	03-0179-01	1	1	Nut, Knurled 15/32-32	
22	03-0185-01	1	1	Nut, Hex 1/4-40	
23	03-1001-01	1	1	Washer, Lock 3/8	
24	03-1004-01	4	4	Washer, Lock 15/32	
25	03-1039-01	4	4	Washer, Lock #6	
26	03-1502-01	2	2	Nut, Hex 3/8-32	
27	03-1503-01	7	7	Nut, Hex 15/32-32	
28	03-1523-01	4	4	Nut, Hex #4-40	
29	03-1528-01	4	4	Nut, Hex, #6-32	
30	03-1534-01	1	1	Nut, Hex, #8-32	
31	03-1029-01	8	8	Washer Lock #4	
32	09-0094-01	1	1	Terminal Lug	
33	09-0097-01	2	2	Terminal Lug #4	
34	09-0242-01	1	1	Knob, Knurled	
35	09-0251-01	1	1	Pawl	
36	09-0252-01	1	1	Spring	
37	09-0387-01	2	2	Guide, Plug-in	
38					
39	09-1907-01	2	2	Plug Button	
40	09-0149-01	1	1	Knob	
41	96-5221-01	1	1	Wrap Around Frame	
42					
43					
44	11-0202-01	1	1	Label	
45					
46	29-0001-03	1	1	RVC., 100K, ±30%, 1/3 W	
47					
48	37-0127-01	1	1	Switch, Toggle, DPTT	
49					
50	00-1045-01	AR	A/R	Sleeving	
51	95-0318-03		1	Assy, Monitor	
52					
53	97-6148-17		1	Assy, Atten. (75 ⁿ) 70dB	
54	97-6148-18		1	Assy, Atten. (75 ⁿ) 10dB	
55					
56	97-9812-01		2	Assy, Cable	
57	97-9811-01		1	Assy, Cable	
58					
59	96-5206-02		1	Front Panel	
60					

95-0314-(-)



NOTES: UNLESS OTHERWISE SPECIFIED.

1. ALL RESISTOR VALUES IN OHMS.
2. ALL CAPACITOR VALUES IN PICO FARADS.
3. ALL RESISTORS ARE 5% $\frac{1}{4}$ W CARBON.
4. -01 & -02 50 Ω UNITS (3340B & 3343B).
- 03 75 Ω UNIT (3340B).

MONITOR, SCHEMATIC MODEL 3340B

B54-0318-()B

				ITEM	PART NUMBER	QTY	DESCRIPTION	CKT REF
						21-02-03		
				1	97-9606-01	3 3 3	Assy Cable	
				2	97-9607-01	1 1	Assy Cable	
				3				
				4	02-1809-01	1 1 1	Set Screw 3-32 x 3/16	
				5	02-7002-04	1 1 1	Screw P.H. 2-56 x 1/4	
				6	02-7004-04	9 9 9	Screw P.H. 4-40 x 1/4	
				7	02-7004-06	5 5 5	Screw P.H. 4-40 x 3/8	
				8	03-0211-01	1	Spacer Teflon	
				9	03-0209-01	1	Spacer Teflon	
				10	03-0210-01	1	Spacer Special	
				11	03-1029-01	12 13 12	Washer Lock #4	
				12				
				13	09-0062-01	1 1 1	Eyelet	
				14	09-0097-01	2 1 2	Lug Solder #4	
				15	09-0555-01	1	Contact, Type N	
				16	13-0621-01	1 1	Housing	
				17	13-0622-01	1 1 1	Cover Housing	
				18	13-0623-01	1 1 1	Side Plate	
				19	13-0621-02	1	Housing	
				20	21-0016-01	3 3 3	Feedthru 1000pF	
				21	21-0053-02	2 2 2	CFCM 1000pF	C2,3
				22	21-0055-04	1 1 1	CFCM 100pF	C4
				23				
				24	26-4047-05	2 2 2	RFC 47 Ω 1/4W 5%	R10,14
				25	26-1523-01	2 2 2	RFC 220 Ω 1/4W 5%	R7,8
				26	26-1519-01	3 3 3	RFC 1K 1/4W 5%	R15,11,12
				27	26-1570-01	1 1 1	RFC 2.7K 1/4W 5%	R9
				28	26-4312-05	2 2 2	RFC 12K 1/4W 5%	R5,6
				29	26-1561-01	2 2 2	RFC 470 Ω 1/4W 5%	R3,R4
				30	27-0252-39	1 1 1	RFMF 99.15 Ω	R2
				31	27-0252-40	1 1 1	RFMF 122.5 Ω	R15
				32				
				33	41-0015-02	3 3 3	DS 1N82A	CR1-3
				34	44-0007-01	1	Connector BNC	
				35	44-0276-01	1	Body Connector	
				36	44-0279-01	1	Body Connector	
				37	57-0318-01	1 1	P.C. Board	
				38	57-0318-02	1	P.C. Board	
				39	64-3708-01	1	Connector	
				40				
				41	63-8830-50	1 1	RFMF 50 Ω	R1
				42	09-0558-01	1	Contact	
				43	09-0557-01	1	Insulator	
				44	09-0556-01	1	Housing Connector	
				45				
				46	43-0043-01	AR AR	#22 Buss Wire	
				47				
				48				
				49				
				50				
				51	63-8830-75	1	RFMF 75 Ω	R1
				52				
				53				
				54				
				55				
				56				
				57				
				58				
				59				

BY _____
 CHK _____
 ENG _____
 APVD _____
 NAME _____
 DATE _____
 1PR (retyped)
 5/17/73


TELONIC INDUSTRIES, INC.
 21282 Laguna Canyon Road • Box 277
 Laguna Beach, California 92652
 Tel 714 494-9401 • TWX 910 596 1320

TITLE ASSEMBLY, MONITOR
 MODEL 3340B, 3343B
 SH 3 OF 3
 SIZE DWA NO
 A 95-0318-()
 REL
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WARRANTY

TELONIC INSTRUMENTS AND ACCESSORIES

Products manufactured by TELONIC/BERKELEY are guaranteed against defective materials and workmanship for a period of one year (vacuum tubes excepted) from date of purchase. This warranty does not apply to instruments that have been altered, improperly handled or damaged in any way beyond our control.

Instruments must be examined immediately upon receipt, since claims for damage in transit will not be honored by the carrier unless prompt action is taken.

CHANGES IN SPECIFICATIONS

The right is reserved to change the published specifications of equipment at any time, and to furnish merchandise in accordance with current specifications, without incurring any liability to modify equipment previously sold.

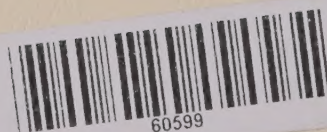
CUSTOMER RETURN OF EQUIPMENT (REPAIR, REPLACEMENT, DUPLICATION, CREDIT, OTHER)

All customer returns require authorization from TELONIC/BERKELEY prior to shipment of equipment. Any equipment returned without authorization for shipment will be at the customer's or distributor's expense.

Instructions for Returning Equipment to Telonic:

1. Contact factory with details of part number, serial number, original purchase order number and reason for return.
2. Telonic will issue instructions on returning the material to the factory or to our regional repair facility. "Please do not return instruments or parts before receiving directions." This will assure you the fastest possible service on Telonic products.
3. Customer is expected to ship all returns prepaid freight. Material will be returned via same shipping method as received unless otherwise instructed.

Units will be shipped "Prepaid"....In Warranty and
"Collect"....Out of Warranty.



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